



Lesson 1,2&3



Photosynthesis
and
Cellular Respiration
Flow of Energy
Cycling of Matter

Rooh Al Ittihad School
Cycle 2-3
Grade 7 Inspire Science
2021/2022
Term 1
Module 1
**Matter and Energy
in Ecosystems**

Page 10-55

Lesson 1 :

Photosynthesis & Cellular Respiration

Page 10-20



Photosynthesis Cellular Respiration Glucose Glycolysis Energy

What is Photosynthesis?

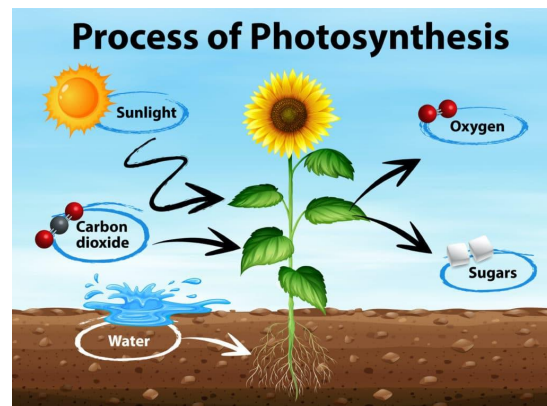
Photosynthesis

Word equation

Carbon dioxide + Water $\xrightarrow[\text{Chlorophyll}]{\text{Light}}$ Glucose + Oxygen

Symbol equation

$6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{Light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$



Photosynthesis :

is a series of chemical reactions that convert light energy, water, and carbon dioxide into the food-energy molecule glucose and give off oxygen.

البناء الضوئي عبارة عن سلسلة من التفاعلات الكيميائية التي تحول الطاقة الضوئية والماء وثاني أكسيد الكربون إلى جلوكوز جزئيء الطاقة الغذائية ويطلق الأكسجين.

Why do plants need sunlight?

- All plants require light (Energy) for photosynthesis
- Plants capture the energy in light, this occurs in chloroplasts which contain pigment chlorophyll

Photosynthesis :

Step 1 :

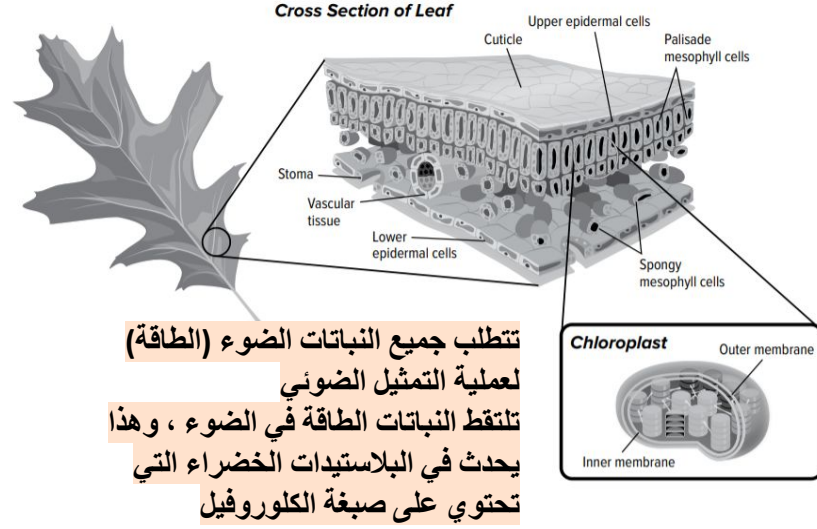
Capturing Light Energy

Step 2 :

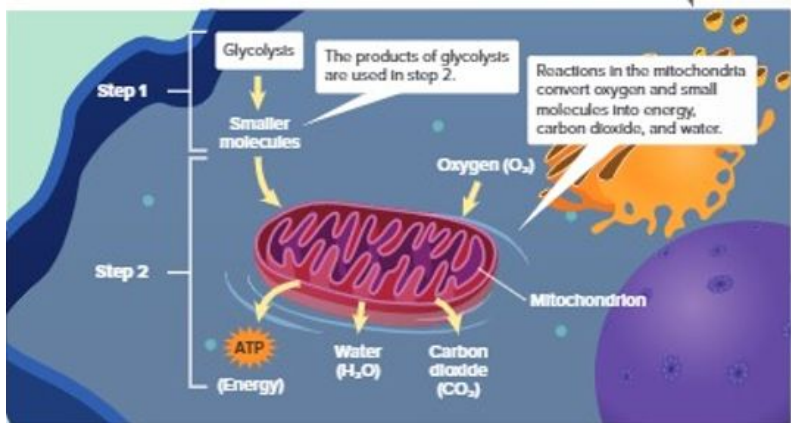
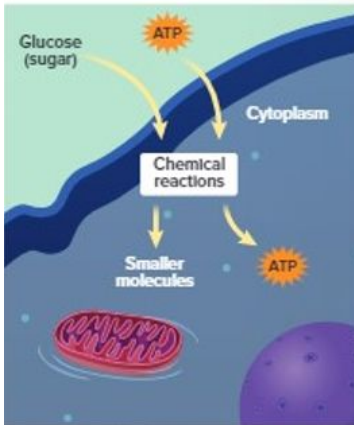
Making Sugars

This step happens in the chloroplast

Plants can use this sugar as an immediate energy source or can store it



What is cellular respiration?



- Cellular respiration is a series of chemical reactions that convert the energy in food molecules into a usable form of energy called ATP
- The first step of cellular respiration is Glycolysis: Glucose is broken down into smaller molecules

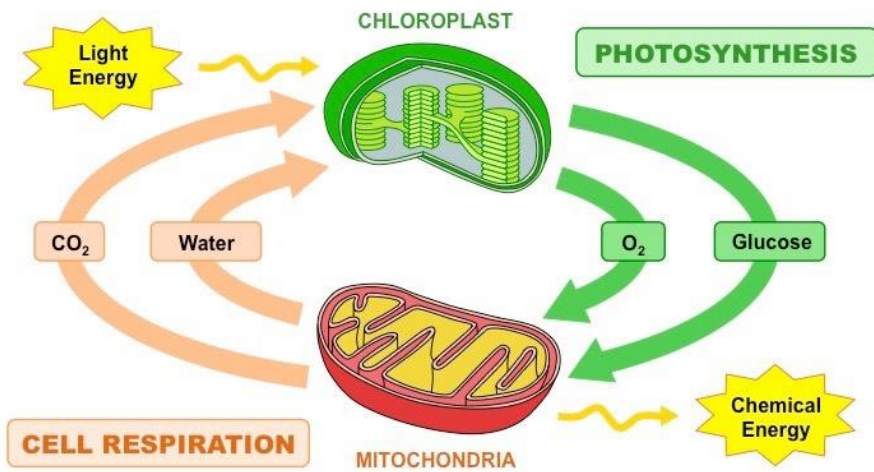
التنفس الخلوي عبارة عن سلسلة من التفاعلات الكيميائية التي تحول الطاقة في جزيئات الطعام إلى شكل قابل للاستخدام من الطاقة يسمى

ATP

الخطوة الأولى للتنفس الخلوي هي تحليل الجلوكوز: يتم تقسيم الجلوكوز إلى جزيئات أصغر






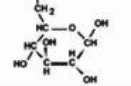
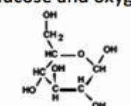



How are Photosynthesis and cellular respiration related?



<https://forms.office.com/r/hCY4QZ07us>

<https://forms.office.com/r/mgfytTXb2Z>

	PHOTOSYNTHESIS	RESPIRATION
Where?	Chloroplasts 	Mitochondria 
When?	In the presence of light 	All the time 
Input	Carbon dioxide and water 	Glucose and oxygen 
Output	Glucose and oxygen 	Carbon dioxide and water 
Energy sources	Light	Chemical bonds
Energy result	Energy stored	Energy released



Lesson 2 : Flow of energy

Page 30-38




- Producers
- Consumers
(Herbivore - Carnivore - Omnivore)
- Decomposers
(Detritivores)
- Food Chain
- Food Web
- Energy Pyramid



Lesson 2:

Flow of Energy

Page
30-32

Producers	Consumers	Decomposers
Make their own food	Eat other organisms for food	Break down dead material
		
منتج	مستهلك	المُحلّلات
يصنع طعام بأنفسهم	أكل الكائنات الحية الأخرى من أجل الغذاء	تحلل المواد الميتة

How do different organisms get energy?

Lesson 2: Flow of Energy

Page 30-32

Producers

- Producers make their own food.
- They do not have to obtain energy from other organisms.
- They obtain their energy from the sun and make food with that energy through the process of photosynthesis.

Chemosynthesis

Is the process by which certain microbes create energy by mediating chemical reactions. (bacteria)

Consumers

- Consumers cannot make food.
- They must find food and eat it to obtain energy.
- Herbivores** are the plant eaters.
- Carnivores** eat only meat.
- Omnivores** eat both meat and plants.

<https://www.liveworksheets.com/my565225tg>
<https://www.liveworksheets.com/ax1409723kx>

Detritivore

(Decomposer)

- A detritivore is an organism that eats dead or decaying plants or animals as food.
- Detritivores include microorganisms such as bacteria and larger organisms such as fungi, insects, worms, and some crustaceans.

Decomposers



Lesson 2: Flow of Energy

Page 34-37

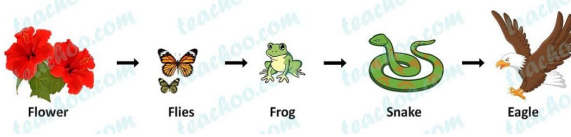


How does energy move through an environment?

Food Chain:

سلسلة غذائية

- Food Chains tells us how energy is transformed from one organism to another.
- Arrows shows transfer of energy.
- Energy decreases in every time.
- Energy flow in one direction only.
- Starts with a producer
- Producer get its energy from the Sun.



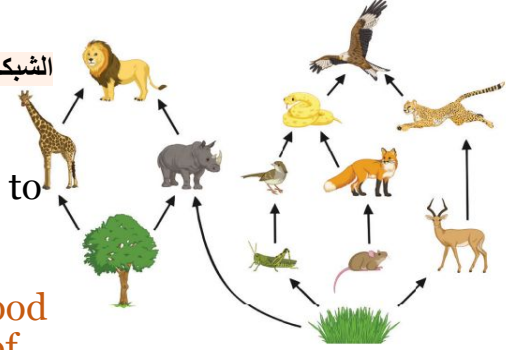
تخبرنا سلاسل الغذاء كيف تتحول الطاقة من
كائن حي إلى آخر.
تتدفق الطاقة في اتجاه واحد فقط

Food Web:

الشبكة الغذائية

Food webs shows how many food chains are connected (overlapping) to each other.

- Some organisms in food web might be a part of more than 1 food chain.



تُظهر شبكات الغذاء عدد سلاسل الغذاء
المرتبطة ببعضها البعض

Lesson 2: Flow of Energy

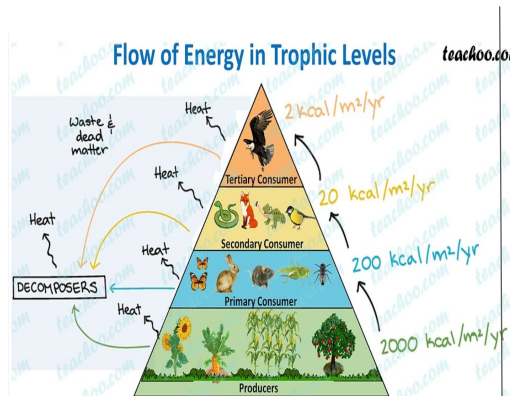
Page 38



Energy Pyramid :

هرم الطاقة

- Energy pyramid Shows the amount of energy available in each step of a food chain.
- The steps of an energy Pyramid are also called Trophic Levels.
- Begins with producer at the bottom
- Only 10 percent of the energy transfer to the next trophic level



يُظهر هرم الطاقة مقدار الطاقة المتاحة في كل
خطوة من خطوات السلسلة الغذائية.
تسمى خطوات هرم الطاقة أيضًا بالمستويات
الغذائية.

<https://forms.office.com/r/UK5Su0zsdQ>

Practice
Questions
Link

<https://forms.office.com/r/SvDpy4pFiD>

Cycles of Matter

Lesson 3 : Cycling of Matter *Page 48-54*

- Carbon Cycle
- Water Cycle
- Nitrogen Cycle
- Oxygen Cycle



How does matter move through an environment?

- **Matter moves through the environment, but instead of flowing through the environment like energy does, matter moves in cycles.**
- **As matter moves in cycles, it changes form. But matter is not created or destroyed when the form changes.**
- **This idea is called the law of conservation of mass**



Carbon cycle

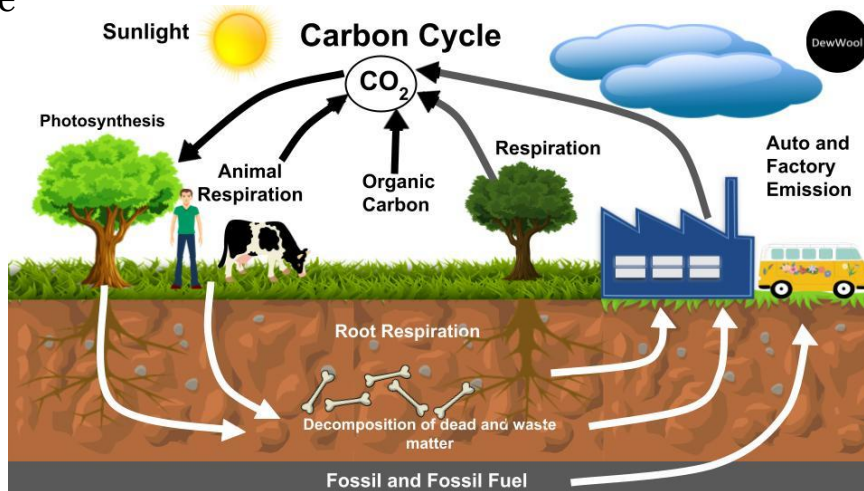
Page 49-50



Carbon Cycle :

The process in which carbon atoms continually travel from the atmosphere to the Earth and then back into the atmosphere

دورة الكربون: العملية التي تنتقل فيها ذرات الكربون باستمرار من الغلاف الجوي إلى الأرض ثم تعود إلى الغلاف الجوي



Fossil Fuels
Phytoplankton
Combustion
Decomposition

Carbon In

1. Plants take CO_2 (photosynthesis)
2. Plants and animal death in soil (decomposition)
3. Phytoplankton in oceans to make shells

Carbon Out

1. Fossil fuels (combustion)
2. Plants and animal Respiration
3. Phytoplankton in oceans



Carbon cycle

Page 49-50



- Carbon in Nature Tiny ocean organisms called **phytoplankton** take in carbon dioxide.

In some types of phytoplankton, the carbon in carbon dioxide is converted to **calcium carbonate**. ($CaCO_3$)

Calcium carbonate is a part of their skeletons.

When the phytoplankton die it sinks to the bottom of the ocean.

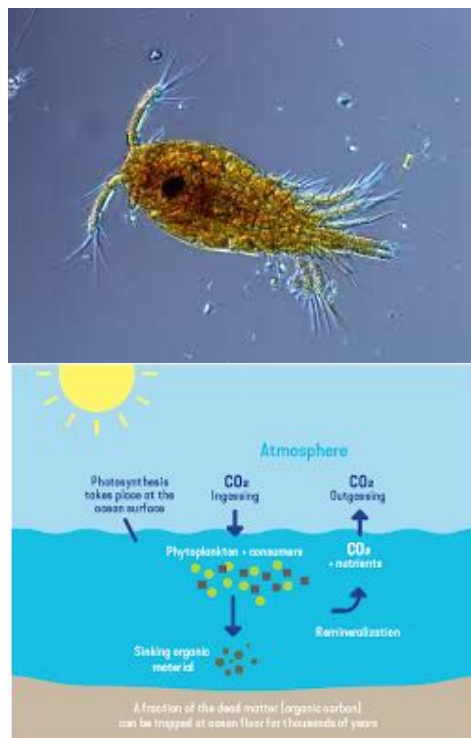
Their skeletons become fossilized.

Over time the fossilized skeletons build up and turn into chalk.

As the chalk is weathered by rain and waves, it releases carbon into the air in the form of carbon dioxide.

Watch the video to understand more

<https://www.youtube.com/watch?v=fBFcpwgp-Xk>



Activities to Practice

<https://wordwall.net/resource/41108/science/carbon-cycle>

<https://wordwall.net/play/041/108/1774>

<https://wordwall.net/play/10734/304/2009>

<https://wordwall.net/play/9404/797/9547>

Live Worksheets Module 1 lesson 3

Water cycle

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Water is always moving from Earth to the atmosphere and back again.

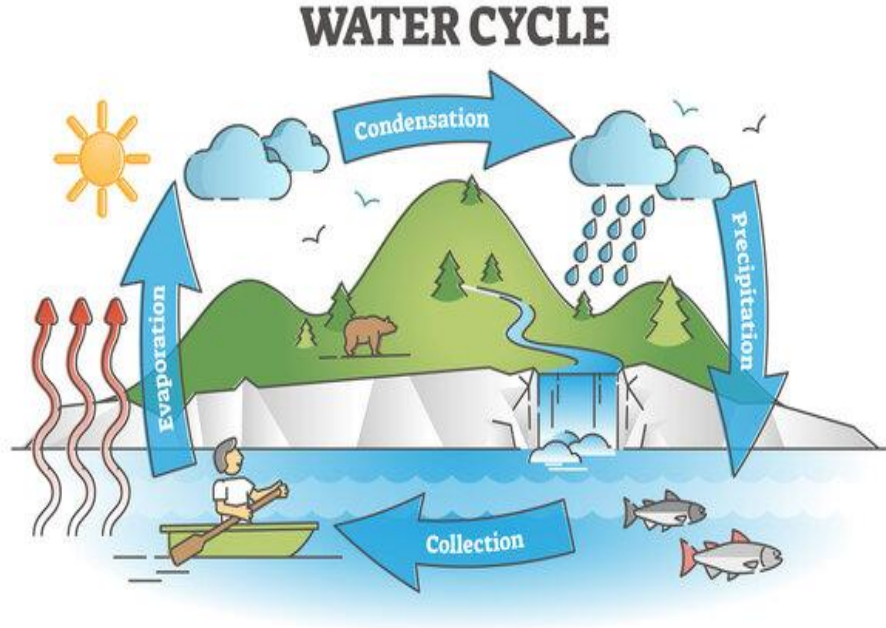
This movement is called
The water cycle.

The water moves by three main processes:

1. Evaporation
2. Condensation
3. precipitation.

Water covers about 70 percent of Earth's surface.

Most of Earth's water, about 97%, is in the oceans.



Water cycle

Page 51-52



• Evaporation	• Transpiration :	• Condensation :	• Precipitation :
is the process during which liquid water changes into a gas called water vapor	• is the release of water from the plant leaves	• is the process during which water Vapor changes into Liquid Water	• Water that falls from clouds to Earth's surface
التبخّر	النتج	التكثيف	الهطول
هو العملية التي يتحول خلالها الماء السائل إلى غاز يسمى بخار الماء	هو خروج الماء من أوراق النبات	هو العملية التي يتحول خلالها بخار الماء إلى ماء سائل	الماء الذي يتساقط من السحب إلى سطح الأرض

Nitrogen fixation : The process that changes atmospheric nitrogen into nitrogen compounds that are usable by living things.

تثبيت النيتروجين: العملية التي تحول النيتروجين الجوي إلى مركبات نيتروجينية يمكن للكائنات الحية استخدامها.

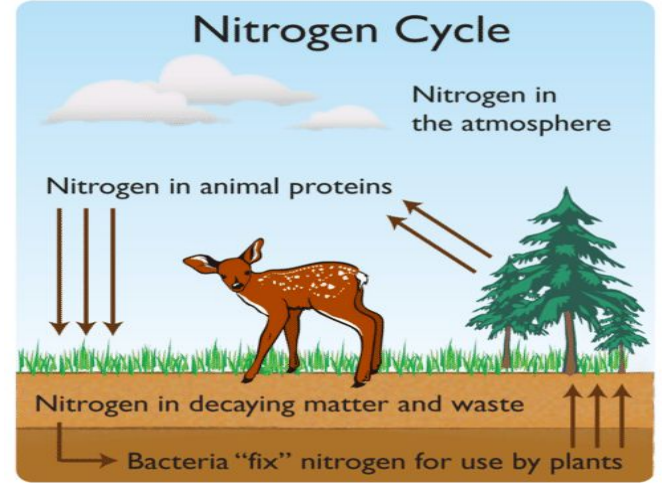
Processes in The Nitrogen Cycle

- 1- Decomposers can break down the tissues of dead organisms.
- 2- When organisms die, nitrogen-fixing bacteria help return the nitrogen in the tissues of dead organisms to the environment.
- 3- Nitrogen also returns to the environment in the waste products of organisms.
- 4- Farmers often spread animal wastes, called manure, on their fields during the growing season. The manure السماد provides nitrogen to plants for better growth.

• Plants and some other organisms take in this changed nitrogen from the soil and water. Then, animals take in nitrogen when they eat the plants or other organisms.

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Fixation nitrogen	تثبيت النيتروجين
Nitrogen-fixing bacteria	البكتيريا المثبتة للنيتروجين
Decomposers	الكائنات المحللة



Nitrogen Cycle

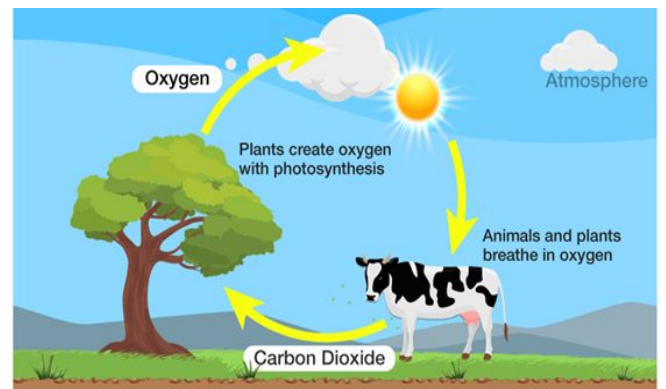
Page 54

The process that changes atmospheric nitrogen into nitrogen compounds that are usable by living things .

- 1- lightning البرق
- 2- nitrogen-fixing bacteria

Oxygen cycle

- Photosynthesis is the main source of oxygen in Earth's atmosphere today.
- Humans and many other living organisms take in oxygen and release carbon dioxide during cellular processes.



- Cellular respiration consume oxygen
- Oxygen is another element that cycles through ecosystems.
- Oxygen is necessary for cellular respiration الخلوي التنفس
- Oxygen is also part of many substances that are important to life, such as carbon dioxide and water.

التمثيل الضوئي هو المصدر الرئيسي للأكسجين في الغلاف الجوي للأرض اليوم.

يأخذ البشر والعديد من الكائنات الحية الأخرى الأكسجين ويطلقون ثاني أكسيد الكربون أثناء العمليات الخلوية.

Forms

Used during the Module

<https://forms.office.com/r/prK'KHPHF7x>

<https://forms.office.com/r/q2bhsC1YWa>

<https://forms.office.com/r/G'WycTf3YnC>

<https://forms.office.com/r/plwaCsG9B0>

<https://forms.office.com/r/ruUzEHrwa>

Practice Questions Link

<https://forms.office.com/r/SvDpy4pFiD>

Liveworksheets



Lesson 1,2&3



Rooh Al Ittihad School
Cycle 2-3
Grade 7 Inspire Science
2021/2022
Term 1
Module 2
Dynamic Ecosystems

Resources in
Ecosystem
Interactions within
Ecosystems
Changing
Ecosystems
Page 74 - 118



Module 2 Objectives

1. Levels of organization? Page 74

1. Resources affecting populations Page 77-78

1. How big can populations get? Page 79-80

2. Symbiosis Relations Page 91-95

2. Other Relations in ecosystem Page 97-98

3. Land Ecosystems Page 109-111

3. Aquatic Ecosystems Page 112-114

3. Changes in Ecosystem Page 116- 118

Lesson 1 : Resources in Ecosystem

Level of Organization



Population	السكان	All living and nonliving things in an environment makes an ecosystem.	
Biotic factor	عامل حيوي	All of the ecosystems on earth makes Biosphere	
Abiotic factor	عامل غير حيوي		
Ecosystem	النظام البيئي		
Community	مجتمع	Environment	البيئة
Species	انواع	Limiting factors	العوامل المحددة في النمو السكاني

Lesson 1 :Resources in Ecosystem

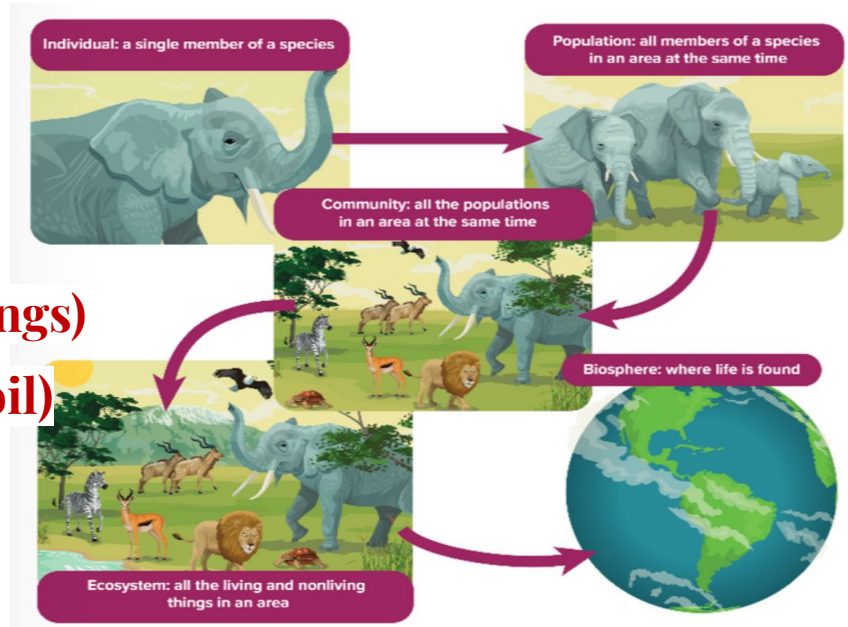
Individual----Population----Community----Ecosystem---- Biosphere

Ecosystem

Biotic

Abiotic

Living things (plants ,animals)
(Nonliving things)
(water,air,soil)



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Lesson 1 :Resources in Ecosystem

Population

Population include all members of a specie in an area at a given time.

Examples:

1. All blue spruce tree in a forest form a Population.
1. Human beings ,plants, animals are different populations.

Species

Is a group of organisms that have similar traits and are able to produce fertile offspring.



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Lesson 1 :Resources in Ecosystem

Lets answer the question

Community

Many different populations make up a community.

Example:

Plants, animals, bacteria, Fungi, are different populations in a community.

A group of organisms that have common characteristics and can reproduce to breed offsprings is called.....

1. Ecosystem 2. Community
3. Species 4. Population

What is a community?

1. A habitat with abiotic factors
2. A very small habitat
3. All the different populations that live together in an area
4. All the abiotic factors in a specific area

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Resources affect populations

Limiting factor is anything that restricts the size of a population.

1. Predators
2. The amount of resources
3. The amount and type of space
4. Disease
5. Competing

Biotic potential	القدرة الحيوية
Carrying capacity	القدرة على التحمل
Overpopulation	الاكتظاظ السكاني

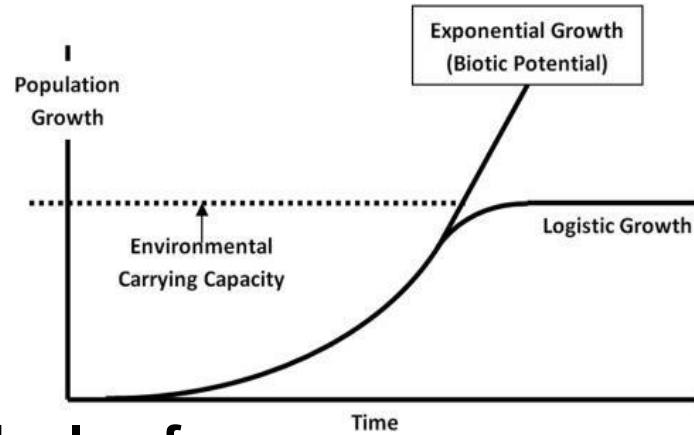
How big can a population get ?

carrying capacity , Biotic potential

*Page
76-78*

Biotic Potential Potential

Is the potential growth of a population if it could grow in perfect conditions with no limiting factors



Carrying capacity

Is the largest number of individuals of one species that an ecosystem can support over

Page 79-80

Lesson 1 : Resources in Ecosystem

Overpopulation

Is when a population size grows so large that cause damage to environment

Lets answer the question

An overpopulation of birds causes the size of the spider population in that community to decrease

True

False

<https://forms.office.com/Pages/ResponsePage.aspx?id=G0mBaUijT0KbaEskboYkXkAjqypXFaJfAqjxcBc0Fhr9UNUJG5jZXWU43S8xJS0Y4UzE2N1BHQUpXUy2u>

Page 79-80

How does population size decrease ?

Extinction: is a species that has died out and no individuals are left.

الأنواع منقرضة

Endangered Species :

Is a species whose population is at a risk of extinction.

الأنواع معرضة للانقراض

Threatened Species:

Species at risk, but not yet endangered.

الفصائل المهددة بالخطر

Symbiosis

A close, long-term relationship between two species that usually involve an exchange of food or energy

Lets answer this Form

<https://forms.office.com/Pages/ShareFormPage.aspx?id=G%20mBaUijTOKBa&skboYkXkAijgypXFaJfAgjxcBc0Thr9URU85QjNKOFVWjNEVEVTNk&yOVp10UJPSy4u&sharetoken=7nzTf1Jlr17P7Y213xNOs>

Symbiosis	تكافل
Relationship	صلة
Mutually beneficial	مفيد للطرفين
Parasitism	التطفل
mutualism	التبادلية
commensalism	معايشة

What are the different types of symbiotic relationships?

3 Types (Commensalism - Parasitism - Mutualism)

Commensalism



A symbiotic relationship that benefits one species but does not harm or benefit the other

Parasitism



A symbiotic relationship that benefits one species and harm the other

Mutualism

A symbiotic relationship in which both partners benefit



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What other types of relationships exist in ecosystems ?

Relationship	صلة
cooperative	تعاوني
predator	مفترس
prey	ضحية
competitive	تنافسي

Cooperative Relationship

A relationship that both organisms work together to help each others

Predator- Prey Relationship

A relationship in which one organism(Predator), eats another (prey)

Competitive Relationship

Organisms that share the same habitat often compete for resources

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Lesson 2 : Interactions within Ecosystem

Predator-Prey Relationships

Predators help prevent prey population from growing *too large* for the *carrying capacity* of the ecosystem.

Predators often capture *weak or injured individuals* of a prey population.

This helps keep the prey population healthy.

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Lesson 3 : Changing Ecosystem

Page 108 & 109

How do land ecosystem Change?

Ecological succession	Process of one ecological community gradually changing into another.
Climax community	Stable community that no longer goes through major ecological changes

Lesson 3 : Changing Ecosystem

Ecological Succession

Primary Succession

الخلافة الأولية

Ecological succession in new area of land with little or **no soil** or vegetation, such as on a lava flow, a sand dune or exposed rock

Secondary Succession

الخلافة الثانوية

In areas where **existing ecosystem** have been distributed or destroyed, secondary succession can occur

Page 109-110

How do aquatic systems Change ?

What factors or changes might affect an aquatic ecosystem?

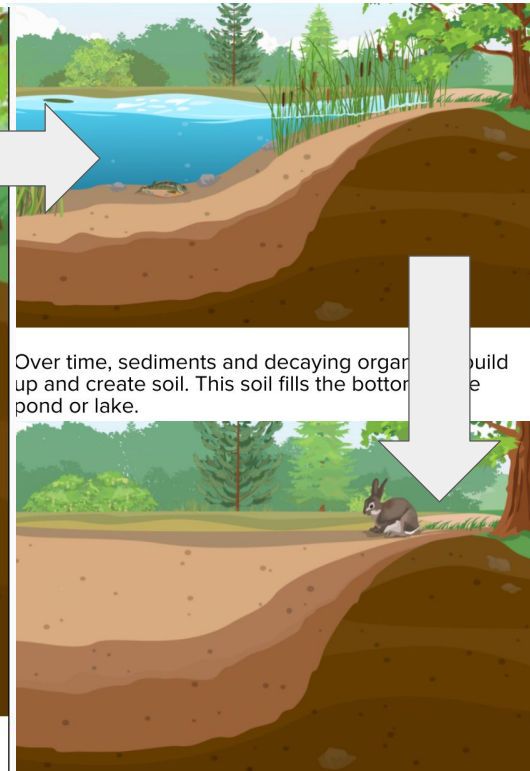
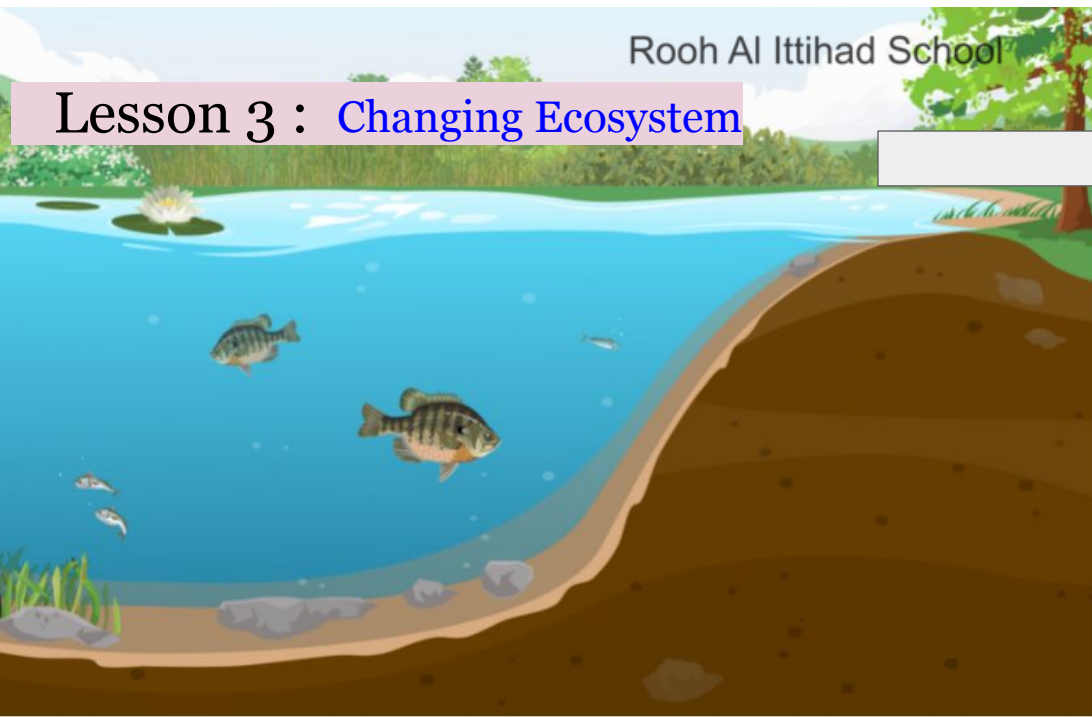
Changes in rainfall, temperature, runoff, sediment build up, human activity
a natural event like a tree falling and blocking a stream

Page 112 & 113

Aquatic succession

Freshwater ecosystem change over time in a natural and predictable process.

Lesson 3 : Changing Ecosystem



Over time, sediments and decaying organic matter build up and create soil. This soil fills the bottom of the pond or lake.

Eventually the pond or lake fills completely with soil and a land ecosystem develops.

Aquatic succession begins with a body of water such as a pond.



Aquatic succession



What changes are occurring to the aquatic ecosystem in this visual?

Sediments and decaying organisms are building up over time. This creates soil that is slowly filling up the pond.

Page 112 - 114

How does the final ecosystem differ from the initial one?

It is completely filled with soil and is now a land ecosystem.

How does the build up of soil affect different organisms in a lake or pond?

1. Aquatic plants can no longer grow, resulting in the loss of a food source for various animals.
2. Fish can no longer swim or get oxygen, resulting in the loss of another food source.
3. Nonliving change can lead to changes in the living components of the ecosystem.

Eutrophication

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Is the process of a body of water becoming nutrient rich

Eutrophication can be natural or enhanced by human activities such as farming

when fertilizer and animal waste high in nutrients wash into waterways.

High nutrient levels support overgrowth of algae and other microscopic organisms.

Dissolved oxygen levels are depleted, reducing the amount available for fish and other aquatic organisms.



Ecological Balance

Dynamic equilibrium

Means that ecosystems maintain balance between different parts.

Natural Disruption

Forest fires
Floods
Volcanic eruptions
Disease

Can cause massive amounts of damage to an ecosystem

Some changes have benefits
Sometimes disturbances control the size of populations or allow new growth of plant life

Lesson 3 : Changing Ecosystem

Human activity that cause disruptions in ecosystem

1. Resource extraction

Any activity that takes resources from nature is known as resource extraction

2. Pollution

When contaminants also known as pollutants are brought into an environment, they cause negative changes

3. Nonnative species: Species lives outside of natural range

Competition and overcrowding can force species out of their natural habitats or cause them die out.

Page 117 & 118

Forms Used during the Module

Lesson 1

<https://forms.office.com/r/iWwAdg5mzS>

Lesson 2

<https://forms.office.com/r/kyps5iYfhz>

Lesson 2

<https://forms.office.com/r/bHMsJYwG8z>

Lesson 2

<https://forms.office.com/r/Qgy44m7AA1>

Lesson 3

<https://forms.office.com/r/zTfMzN6KCK>

Liveworksheets

<https://www.liveworksheets.com/tn1089746vo>

<https://www.liveworksheets.com/bj1575252fy>

<https://www.liveworksheets.com/ui1614071ur>

<https://www.liveworksheets.com/kq1253473io>

<https://www.liveworksheets.com/lx1244134uo>

<https://www.liveworksheets.com/ok2567756jl>

<https://www.liveworksheets.com/xm1283798by>



Rooh Al Ittihad School

Cycle 2-3

Grade 7 Inspire Science

2021/2022

Term 1

Module 3

Biodiversity in Ecosystems

Lesson 1

Benefits of Biodiversity

Page 140 - 163



Lesson Objective



What is biodiversity? Page 141

What are the types of Biodiversity ? Page 141

6 Types to measure Biodiversity Page 142-144

Calculating Biodiversity Index Page 144-145

Why is biodiversity important? Page 149-150

Land Biomes Page 151-154

Aquatic Biomes Page 155 - 158

Ecosystem Services Page 160- 162



**Key
words**

Biodiversity	التنوع البيولوجي
Species	الأنواع
Genetic diversity	التنوع الجيني
Species diversity	تنوع الأنواع
Ecosystem diversity	تنوع النظام البيئي

Biodiversity

is the number and variety of organisms found in a specific region, such as a small pond, a grassy field, a desert or all of earth



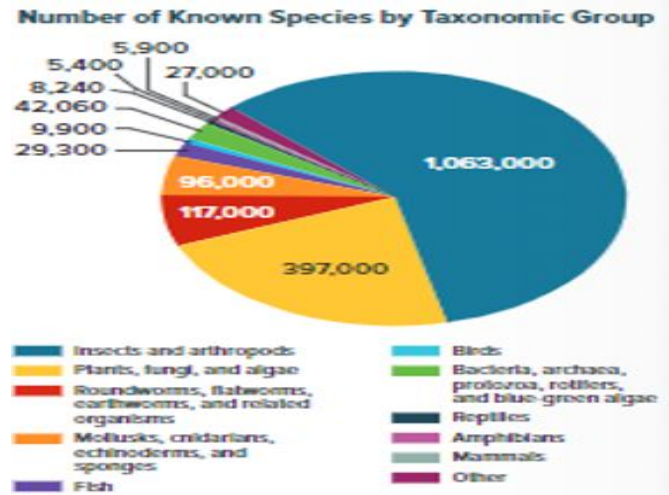
التنوع البيولوجي هو عدد الكائنات الحية الموجودة في منطقة معينة وتنوعها ، مثل بركة صغيرة أو حقل عشبي أو صحراء أو كل الأرض

Species

A group of organisms that have similar traits and are able to produce fertile offspring

الأنواع: مجموعة من الكائنات الحية لها سمات متشابهة وقادرة على إنتاج نسل خصب

A recent estimate of the total number of species on earth both known and yet to be discovered approximately **9 million**



Choose The correct answer

1. Which species is more in number?

A. Birds

B. Fish

C. Insects and arthropods

2. How many fish species are there?

A. 1063000

B. 29300

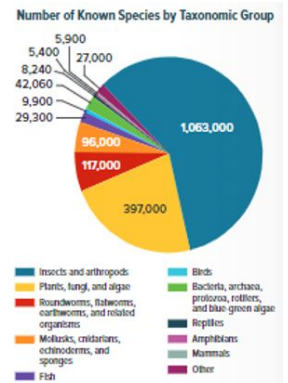
C. 397000

3. Which color is used to represent Plants, fungi and algae

A. Red

B. Blue

C. Yellow



4.is the number of different types organisms living in a certain place

A. Biodiversity

B. Species

C. Birds

What are the types of Biodiversity ?

3 Types (Genetic - Species - Ecosystem)

Genetic diversity

The variety of genes or inherited traits that are present in a population

Ecosystem diversity

The variety of ecosystem in the biosphere

Species diversity

Diversity exists with in species as well as with in an ecological community as a whole

Identify and match

1. Genetic diversity

2. Species diversity

3. Ecosystem diversity

A



B



C



6 Types to measure Biodiversity



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Canopy fogging

Transect Sampling

Mist Netting

Aerial Photos

Survey

Quadrat sampling



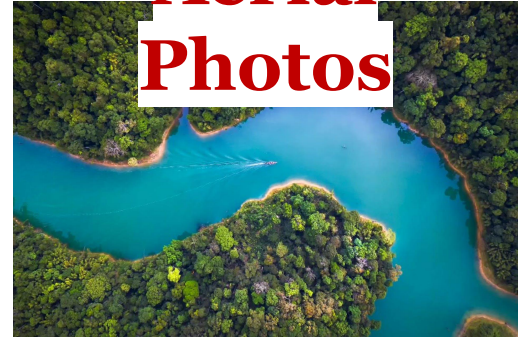
Canopy fogging

1. A low dose of insecticide is sprayed up into top of tree to kill the insects, causing them to fall from tree.
2. They are collected by large screen or sheet.
3. Scientist study the insects, identify and count them



1. Photos of ground taken from above
2. Can be used to count and track species of whales and herds of migrating animal on land.
3. Can also be used to assess biodiversity of trees

Aerial Photos



Transect sampling

1. Scientist use a transect line (Rope or String or measuring tape) marked at set intervals such as every meter or every 2 meter

2. The transect line is placed in or on the habitat surface.

3. At every interval, the number of species and individuals are recorded

4. Use in Terrestrial and aquatic habitat



Mist netting

1. Fine mesh nets are used to humanely capture animals

2. In terrestrial ecosystem often used to collect data from birds and bats

3. In aquatic ecosystem fish and other organisms are captured



Surveys

1. An effective way to learn about the biodiversity of certain group of organisms (Particularly Birds)

2. People going through a habitat on foot or in a boat

3. use binoculars and spotting scope to identify and count number of species



Quadrat sampling

A quadrat is a square area marked using a premade square of plastic or stake and string

1. Size range from 1 square meter to 20 square meter
2. Used in both aquatic and terrestrial ecosystem
3. Scientist set down the quadrat and count the number of individuals of each species



Identify and match

1. Canopy fogging
2. Transect sampling
3. Mist netting
4. Aerial Photos
5. Survey
6. Quadrat sampling

A



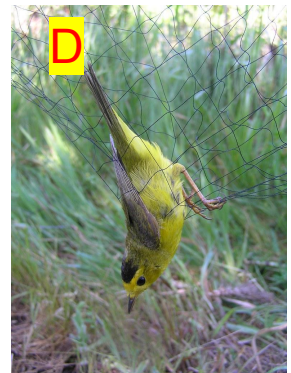
B



C



D



E



F





Calculate Biodiversity Index

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Number of Species	Number of Individuals of Each Species	Total Number of Individuals	Biodiversity Index
6	Species A = 4 Species B = 30 Species C = 1 Species D = 3 Species E = 1 Species F = 2	41	0.15

1. **MATH Connection** To find the biodiversity index, first find the total number of individuals by adding up the number of individuals of each species.

Species A + Species B + Species C + Species D + Species E + Species F = _____

$$4 + 30 + 1 + 3 + 1 + 2 = 41$$

Record your answer for the total number of individuals in the table above.

2. Then calculate the biodiversity index by dividing the number of species by the total number of individuals.

$$\frac{\# \text{ of species}}{\# \text{ of individuals}} = \frac{6}{41} = 0.15$$



Calculating Biodiversity

The biodiversity index

It is simple formula that scientist often use to calculate the biodiversity of an area.

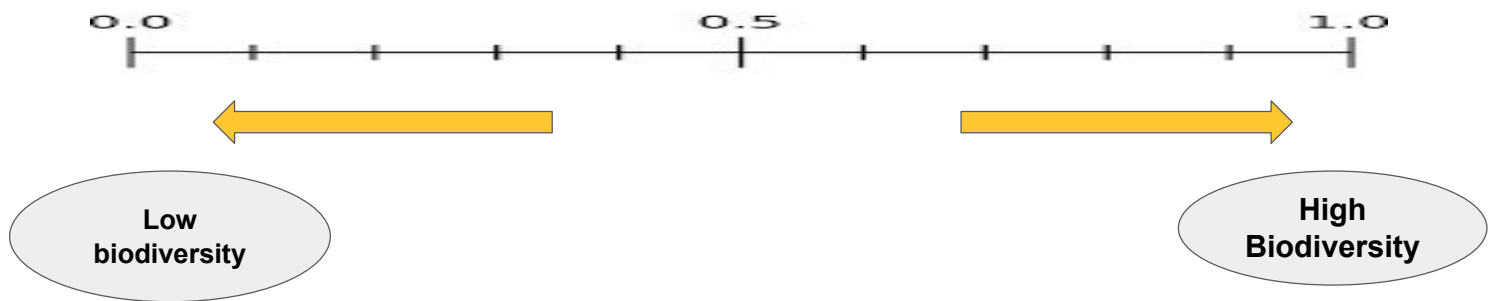


$$\text{Biodiversity Index} = \frac{\text{Number of species in an area}}{\text{Total number of individuals in the same area}}$$

Interpreting a Biodiversity Index

The closer to zero : The lower the biodiversity of an area

The closer to 1 : The higher the biodiversity of an area



Why is Biodiversity important?



Number of Species and Ecosystem Health

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The higher the biodiversity in an ecosystem, the healthier it is considered to be. Although there are several models that relate the impact that biodiversity has on the health of an ecosystem,

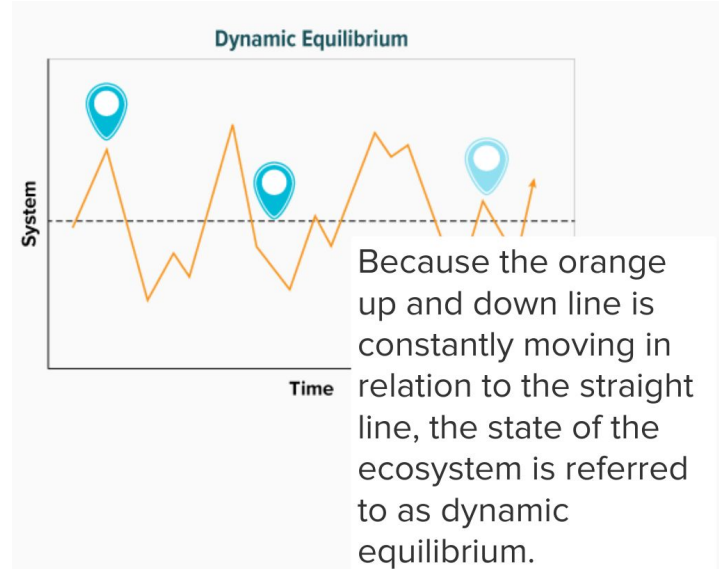
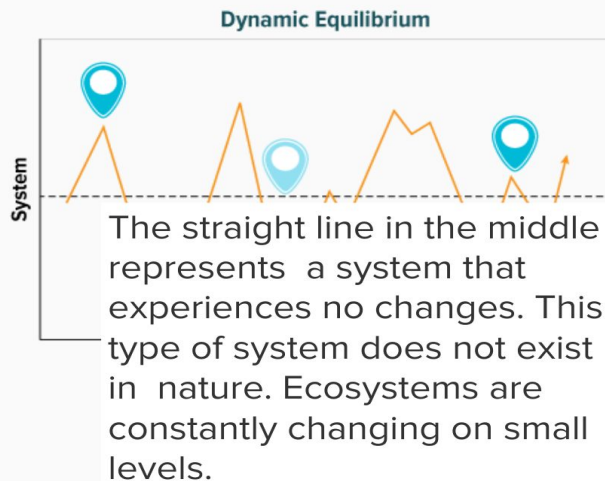
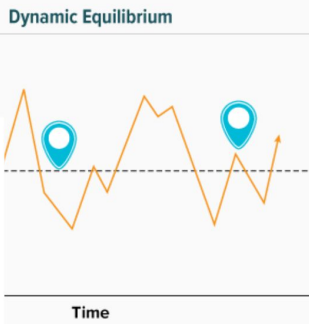
Scientists agree that decreasing biodiversity does lead to reduced ecosystem health and function.



Dynamic equilibrium

A stable ecosystem

The orange line represents natural processes bringing an ecosystem towards a balanced state while adjusting to the changes.



Resilience

is the ability of an ecosystem to maintain dynamic equilibrium even with significant outside disturbances.

THREE-DIMENSIONAL THINKING

How does biodiversity relate to **stability and change** in an ecosystem? Give an example of a change in biodiversity causing another change that brings the ecosystem back to dynamic equilibrium.

Type answer here.

Clear

Answer :

When an ecosystem has high biodiversity, it is more stable. Higher biodiversity allows ecosystems to more easily respond to a change. Changes to biodiversity can lead to changes in other parts of an ecosystem as well.

Land Biomes

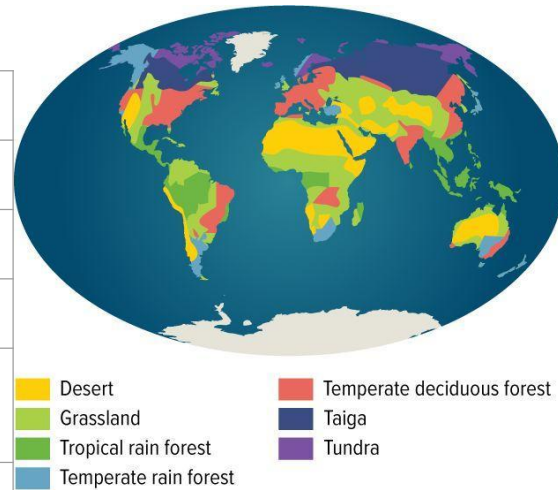
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A **biome** is a geographic area on Earth that contains ecosystems with similar biotic and abiotic features.

Earth has 7 Major land Biomes

Desert
Grassland
Tropical rainforest
Temperate rainforest
Temperate deciduous forests
Taiga
Tundra



Grassland

Grassland Biomes are areas where grasses are the dominant plants.

- Also called prairies, savannas, and meadows, grasslands are natural carbon sinks.
- Grasslands are rich in invertebrates, as well as birds and mammals.

Desert

A **desert** Is a type of biome that receives very little rain.

- Deserts make up roughly $\frac{1}{3}$ Earth's land mass
- It is the driest ecosystem.
- Desert animals and plants that grow in deserts, have had to adapt to the hot and dry environment in which they live.



Lets match

1. Driest regions in the world . Little rain
. Hot days and very cold nights. A few
grasses, small shrubs. Snakes
, scorpions, lizards and camels.

A. Grassland



2. Flat areas with grass and a few
trees. Hot summer and cold winter.
Grazing animals, buffaloes, coyotes
and foxes.

B. Desert



Tropical Rainforest

Tropical rain forests.

Forests that grow near the equator and experience heavy annual rainfall.

These forests are generally warm and moist.

- With a great number of different plants and animals, tropical rain forests feature a high level of biodiversity.

Temperate Rainforest

Temperate Rain Forests

- Temperate regions have relatively mild climates with distinct seasons.
- Temperate rain forests are moist ecosystems mostly in coastal areas and are not as warm as tropical rain forests.
- Due to seasonal changes and varied temperatures, temperate rain forests do not feature as much biodiversity as tropical rain forests.

Deciduous forest

Temperate Deciduous Forests

Forests that grow in temperate regions where winter and summer temperatures have more variation than those in temperate rain forests are called temperate deciduous forests.

- These forests are the most common forest ecosystems in the United States.
- They contain mostly deciduous trees, which lose their leaves in the fall.



Lets match

1. Humid regions with cool summer grow near the equator and experience heavy annual rainfall.

A. Tropical Rainforest



2. Forests that grow near the equator and experience heavy annual rainfall.

B. Temperate rainforest



3. Mild climates with distinct seasons and as warm as Tropical forest.

C. Deciduous rainforest



Taiga

Taiga is a forest biome consisting mostly of cone-bearing evergreen trees.

- A taiga is also known as a boreal forest and exists only in the northern hemisphere.
- Due to colder temperatures, fewer reptiles and amphibians can survive, and there are fewer species of mammals and birds.

Tundra

A **tundra** biome is cold, dry, and treeless.

- Most tundra is just south of the North Pole.
- In the tundra, frozen ground makes it difficult for deep-rooted plants to grow.
- The tundra does feature a diverse range of mammalian life; however, reptiles and amphibians are rare.



Aquatic ecosystems

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Aquatic ecosystem	النظام البيئي المائي
Wetlands	الأراضي الرطبة
Estuaries	مصبات الأنهار
Ocean	محيط
Intertidal Zones	مناطق المد و الجزر
Coral reef	شعاب مرجانية

Types of Aquatic ecosystem

An ecosystem in a body of water

1. **Fresh water** : Streams, Rivers, Ponds and lakes
2. **Wetlands**: Thin layers of water covering soil that is wet most of the time
3. **Estuaries**: Regions along coastlines where streams or rivers flow into a body of salt water
4. **Oceans**: The ocean is the body of salt water that covers approximately 70.8% of the surface of Earth and contains 97% of Earth's water

Stream and rivers:

Stream: Narrow, shallow and fast flowing

Rivers: Large, deeper and flow slowly

- ☐ Species adapted to fast moving water: Salmon, crayfish
- ☐ Species adapted to slow moving water: snail, catfish

Stream

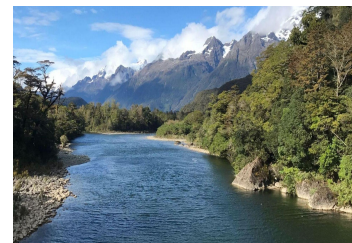


Ponds and Lakes:

Freshwater that is not flowing downhill makes up ponds and lakes

- ☐ These bodies of water form in low area on land
- ☐ Ponds are shallow and smaller than lake
- ☐ Surface of water contains plants and algae

River



Wetlands:

Some of earth's most fertile ecosystem are wetlands. Wetlands form at the edges of lakes and ponds and in low area of lands

- Nutrient levels and biodiversity are high
- Water tolerant plants such as
- grasses and cattails, thrive in wetlands
- Insects are abundant

Estuaries:

Nutrient levels and biodiversity are high in estuaries

- Plants that grow in estuaries include mangroves and seagrasses
- Animals include worms, snails and many species that people use for food
- Many species of birds depends on estuaries for breeding, nesting and feeding

Identify and match

1. Stream and rivers

A. Water not flowing

2. Ponds and lakes

B. Region along coastlines

3. Wetlands

C. Water flowing

4. Estuaries

D. Have Thin layer of water covering soil

Types of Ocean ecosystem

1. Open oceans

2. Intertidal zones

3. Coral Reefs

Ocean ecosystem

The ocean is the body of **salt water** that covers approximately **70.8%** of the surface of Earth and contains 97% of Earth's water



Open oceans

Extends from the steep edges of continental shelves to the deepest parts of the ocean

- Microscopic algae and other producers form the base of most ocean food chains
- Other species include Jellyfish, tuna, mackerel, dolphins, sea cucumbers and brittle stars

Intertidal zones

Ocean shore between the lowest low tide and highest high tide

- When tide reaches rock and beach covered by water, when tide falls rocks and beaches are left uncovered and exposed to the air
- Habitat for many organisms and nursery area for many fish and crustacean species

Coral Reefs شعاب مرجانية

Underwater structure made from outside skeletons of tiny, soft bodied animals called coral

- Most coral reefs form in shallow tropical zone
- Like Parrotfish, groupers, angelfish, eels, shrimp, crabs

Identify and match

1. Open ocean

A. Underwater structure made from outside skeletons of tiny, soft bodied animals

2. Intertidal zone

B. Extends from the steep edges of continental shelves to the deepest parts of the ocean

3. Coral reef

C. Ocean shore between the lowest low tide and highest high tide

Types of ecosystem services

1. Supporting services

2. Provisioning services

3. Regulating services

4. Cultural services



Key Terms

Supporting Services	خدمة الدعم
Provisioning Services	خدمات الامداد
Regulating Services	تنظيم الخدمة
Cultural Services	الخدمات الثقافية

1. Supporting services :

- That allow for the existence of all other ecosystem services
- Include Primary production, water cycling and nutrient cycling

2 Provisioning services:

- Provide product from an ecosystem
- Provide us with food, medicine, natural resources

3 Regulating services:

- Benefits that are received through the regulation of ecosystem
- Include Pollination, water purification, protection

4 Cultural services: Benefits that people obtain through their experience

- The benefits are nonmaterial, offering values.

Ecosystem services

PROVISIONING

products obtained from nature, such as food and timber



REGULATING

services provided by nature that regulate our environment, such as water and air cleaning services



CULTURAL

non material benefits provided by nature which enrich lives such as recreation, learning and tranquillity



SUPPORTING

the underpinning (or supporting) services which enable other services to function, such as soil formation and nutrient recycling



Forms Used during the Lesson

Lesson 1.2

<https://forms.office.com/r/H3p4bbh1vJ>

Lesson 1.3

<https://forms.office.com/r/iWwAdg5mzS>

Lesson 1.4

<https://forms.office.com/r/rY4pnhdS0Z>

Lesson 1.5

<https://forms.office.com/r/qR8UbTpB99>

Liveworksheets

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